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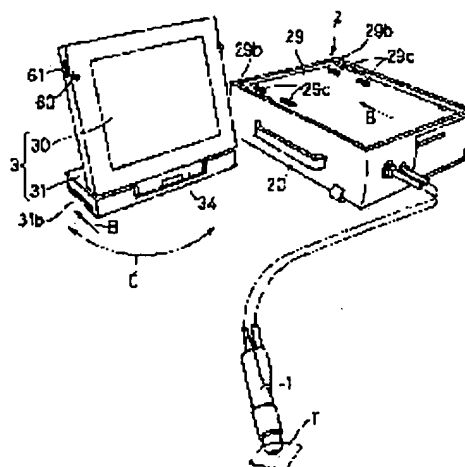
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(54) MAGNIFYING OBSERVATION DEVICE AND VIDEO DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a magnifying observation device which can be easily placed in an easily visible position and is capable of making a contribution to the reduction in the size of working space.

SOLUTION: This magnifying observation device has an image pickup section 1 which picks up magnified images, a signal processing circuit which captures the signal from this image pickup section 1 and subjects the signal to signal processing and a video section 3 which projects the magnified images according to the signal from this signal processing circuit. In such a case, the video section 3 has a display 30 and a self-standing means 31 for self-standing of the video section 3. The video section 3 is freely attachably and detachably disposed to and from the mounting surface 29 of the control casing 20 housing the signal processing circuit.



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CLAIMS

[Claim(s)]

[Claim 1] The expansion observation equipment with which the aforementioned image section is prepared free [attachment and detachment of the aforementioned image section] to the wearing side of the control case have a drop and an independence means for making the aforementioned image section become independent, and hold the aforementioned digital disposal circuit in expansion observation equipment equipped with the image pck-up section which picturizes an expansion picture, the digital disposal circuit which incorporate and carry out signal processing of the signal from this image pck-up section, and the image section which project an expansion picture according to the signal from this digital disposal circuit.

[Claim 2] Expansion image pck-up equipment with which the aforementioned independence means consists of the base attached free [rotation] to the aforementioned drop in a claim 1, and this base is attached free [attachment and detachment] to the wearing side of the aforementioned control case.

[Claim 3] Expansion observation equipment with which the engagement means for the aforementioned base and a control case engaging with the aforementioned base and a control case mutually is established in the claim 2.

[Claim 4] Expansion observation equipment it enabled it to use in a claim 3 in the separation state which removed the aforementioned image section from the aforementioned control case as a standing-up base for the base of the aforementioned image section making the aforementioned drop stand up.

[Claim 5] It is expansion observation equipment currently formed so that it may be mutually engaged in the direction which intersects perpendicularly with the aforementioned wearing side while permitting that, as for the aforementioned engagement means, the aforementioned base carries out slide movement of the wearing

side top of the aforementioned control case along the wearing side of the aforementioned control case in a claim 4.

[Claim 6] Expansion observation equipment which equips the aforementioned base and the control case with a fixed means to fix so that the aforementioned base may not carry out slide movement in the state where the aforementioned control case was equipped with the aforementioned base, in the claim 5.

[Claim 7] in order to prepare the heights for installation in the pars basilaris ossis occipitalis of the aforementioned base and to make it the aforementioned heights for installation not, contact the wearing side of the aforementioned control case on the other hand in a claim 6 in the aforementioned wearing side at the time of slide movement of the aforementioned base -- missing -- business -- the expansion observation equipment with which the hollow is prepared

[Claim 8] Expansion observation equipment with which one or more [of the cell applied parts for equipping the aforementioned image section with the connector, power circuit, or cell for connecting a power supply in a claim 1 or 2] is prepared.

[Claim 9] Expansion observation equipment with which the connector which connects a power supply to the aforementioned image section and the aforementioned control case, respectively is prepared in a claim 1 or 2.

[Claim 10] The image pck-up section which picturizes an expansion picture, and the digital disposal circuit which incorporates and carries out signal processing of the signal from this image pck-up section, It is image equipment used for the expansion observation equipment which projects an expansion picture according to the signal from this digital disposal circuit. this image equipment A drop, It is image equipment which can become independent by the aforementioned independence means in the state of the separation which the aforementioned image equipment has the engagement section which engages with the engaged section by the side of the aforementioned control case by having an independence means for making the aforementioned image equipment become independent, and was removed from the aforementioned control case.

[Claim 11] Image equipment with which the aforementioned independence means consists of the base attached free [rotation] to the aforementioned drop in a claim 10, and this base is attached free [attachment and detachment] to the wearing side of the aforementioned control case.

[Claim 12] Image equipment with which one or more [of the cell applied parts for equipping with the connector, power circuit, or cell for connecting a power supply to the aforementioned image equipment in a claim 11] is prepared.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to expansion observation equipment like the so-called microscope, and its image equipment.

[0002]

[Description of the Prior Art] Conventionally, expansion observation equipment 100 as shown in drawing 22 is known. In drawing 22, the expansion picture picturized in the image pick-up section 101 is projected on the liquid crystal display 103 of exclusive use through the digital disposal circuit built in the control case 102. Since the image pick-up section 101 is connected with the control case 102 by the cable 104, unlike the so-called microscope, this expansion observation equipment 100 has the advantage of it not being necessary to cut down Object T etc.

[0003]

[Problem(s) to be Solved by the Invention] However, if it is going to rotate a liquid crystal display 103 around the vertical-axis line V like Arrow C conventionally, since the liquid crystal display 103 is united in the big control case 102, it is hard to make it rotate. Therefore, since an angle of visibility is restricted, a picture is hard to see. That is, an operator needs to sit on the transverse plane of the control case 102, and needs to look at a liquid crystal display 103, and a liquid crystal display 103 becomes hard to see at the man of right and left of the operator concerned. Moreover, since the liquid crystal display 103 is always united with the control case 102 and the big control case 102 becomes obstructive, a workspace becomes narrow. Moreover, the fan for cooling is attached in the control case 102 so that the lamp for exposure (for lighting) may not overheat. Therefore, in case expansion observation of the object T is carried out on the same desk as the control case 102, a picture may blur by vibration of the fan for cooling. Since expansion observation was carried out especially, a minute vibration also had the problem that the picture outputted blurred greatly.

[0004] Therefore, the purpose of this invention is offering the expansion observation equipment and image equipment which can solve this conventional problem.

[0005]

[Means for Solving the Problem] In order to attain the aforementioned purpose, the expansion observation equipment of this invention In expansion observation equipment equipped with the image pick-up section which picturizes an expansion picture, the digital disposal circuit which incorporates and carries out signal processing of the signal from this image pick-up section, and the image section which projects an expansion picture according to the signal from this digital disposal circuit The aforementioned image section is equipped with a drop and the independence means for making the aforementioned image section become independent, and the aforementioned image section is prepared free [attachment and detachment] to the wearing side of the control

case which holds the aforementioned digital disposal circuit.

[0006] The expansion observation equipment of this invention can observe the image of the drop of the image section, where the image section is attached in a control case. On the other hand, also in the separation state which removed the aforementioned image section from the control case, the aforementioned drop can be used as a posture in which it was made to stand up by the independence means. In this separation state, since it becomes lightweight only in the image section, this image section can be rotated a little around a vertical-axis line, and it can set up and use for a legible angle.

[0007]

[Embodiments of the Invention] Hereafter, 1 operation gestalt of this invention is explained according to a drawing. As shown in drawing 1, this expansion observation equipment is equipped with the image pck-up section 1, the controller section 2, and the image section 3. It connects mutually [the aforementioned controller section 2 and the image section (image equipment) 3] at a cable 41 and a fiber optic cable 42.

[0008] As shown in drawing 2, as for the image pck-up section 1, CCD (image pck-up element) 10 and the lens unit 11 are held in the tube-like object 12. The lighting system 13 which illuminates a visual field with the light by which the light guide was carried out from the aforementioned fiber optic cable 42 (drawing 1) is formed at the nose of cam of this image pck-up section 1. In addition, the lamp for lighting (not shown) which is the light source of the aforementioned lighting system is held in the main part case (control case) 20 of the controller section 2 of drawing 1. Moreover, in this main part case 20, the fan for cooling the lamp for the aforementioned lighting is prepared.

[0009] The handle 200 is formed in the aforementioned main part case 20. In this main part case 20, the digital disposal circuit 21 and the CCD drive circuit 22 which are shown in drawing 2, and the 1st power circuit 23 are held. The aforementioned digital disposal circuit 21 is equipped with the image-processing means 24, the measurement means 25, and the frame memory 26. The aforementioned image-processing means 24 performs an image processing to the image pck-up information memorized by the frame memory 26. The aforementioned measurement means 25 computes the area of the predetermined field surrounded by the distance for two points which is the function which computes a geometric value, for example, was clicked on the liquid crystal display monitor (drop) 30 (specification), the angle defined by three points, and the segment etc.

[0010] The aforementioned image section 3 is equipped with a display controller 32 and the 2nd power circuit 33 while it is equipped with the aforementioned liquid crystal display monitor 30 and the base (an example of drawing 1 and an independence means) 31. This expansion observation equipment incorporates and carries out signal processing of the signal of the expansion picture picturized by CCD10 of the image pck-up section 1 to a digital disposal circuit 21, and projects an expansion picture on a liquid crystal display monitor 30 through a display controller 32 by the signal from this

digital disposal circuit 21.

[0011] As shown in drawing 3 , the 1st and 2nd connectors 27 and 37 for signals and connectors 28 and 38 for power supplies are prepared in the main part case 20 of the controller section 2, and the base 31 of the image section 3, respectively. The aforementioned connectors 27 and 37 for both signals are for connecting the controller section 2 and the image section 3 by the signal line 80 (drawing 2). The aforementioned connectors 28 and 38 for both power supplies are for connecting the power supply line linked to a source power supply.

[0012] Below, the important section of this invention is explained. As shown in drawing 1 , the liquid crystal display monitor 30 of the aforementioned image section 3 stands it still at arbitrary angles while being attached in the circumference of a level axis free [rotation] through the hinge region 34 to the base 31. As shown in drawing 4 , as it has fixed part 34a of a cylindrical shape, and rotation section 34b and the arrow A of this drawing shows, the wiring material (harness) 35 is wired and the wiring material 35 cannot disconnect the aforementioned hinge region 34 easily due to rotation operation of a hinge region 34. Moreover, when lobe 34c shown in drawing 5 is prepared in rotation section 34b of the aforementioned hinge region 34, this lobe 34c pushes a pilot switch 36 and the liquid crystal display monitor 30 of drawing 1 is closed as a two-dot chain line shows, the power supply of a liquid crystal display monitor 30 is OFF. It becomes.

[0013] As shown in drawing 6 , the aforementioned image section 3 can detach now and attach the base 31 to the wearing side 29 of the main part case 20. Hereafter, this structure is explained. Engagement slot (engagement means : engagement section) 31b is formed in both-sides section 31a of the base 31 shown in drawing 7 (a). On the other hand, engagement protruding line (engagement means : engaged section) 29b is formed in both-sides section 29a of the wearing side 29 of the main part case 20 shown in drawing 7 (b) at one. Aforementioned engagement slot 31b and engagement protruding line 29b are mutually engaged in the direction which intersects perpendicularly with the wearing side 29 after wearing while they permit that the base 31 of drawing 6 carries out slide movement of the wearing side 29 top in the direction of arrow B along the wearing side 29 of the main part case 20.

[0014] In addition, the aforementioned engagement protruding line 29b is prepared on the side of the couple which the main part case 20 counters mutually, as shown in drawing 6 . Moreover, in this invention, the portion equipped with the base 31 and/or a liquid crystal display monitor 30 is said along with one flat surface in the main part case 20 of the abbreviation rectangle which has six flat surfaces with the geometric "wearing side 29."

[0015] The fixed means 5 of drawing 7 is formed in the aforementioned main part case 20 and the base 31. this fixed means 5 -- the locking device 50 of drawing 7 (a), and engagement of drawing 7 (b) -- it consists of a hole 51 the knob section 52 which rotates

the aforementioned locking device 50 to the circumference of a vertical-axis line as shown in drawing 8 (a) and (b) -- having -- **** -- this knob section 52 rotating 180 degrees -- the piece 53 of engagement of drawing 8 (d) -- the direction of an arrow -- moving -- engagement of drawing 7 (b) -- a hole 51 is engaged and released the state where the aforementioned fixed means 5 equipped the main part case 20 with the base 31 of drawing 7 (a) -- setting -- the aforementioned piece 53 (drawing 8 (d)) of engagement -- engagement -- it is engaging with the hole 51, and it fixes so that the base 31 may not carry out slide movement In addition, the knob section 52 of drawing 8 has the structure of ****(ing) as shown in drawing 8 (b) and (c).

[0016] Two or more heights 31c for installation shown with a dashed line is prepared in the base of the base 31 of aforementioned drawing 7 (a). This heights 31c for installation is for example, a product made of rubber, and like drawing 6 , when the image section 3 is directly placed on a table etc., it is for planning the stability and the skid of the base 31. on the other hand -- the wearing side 29 of the aforementioned main part case 20 -- missing -- business -- hollow 29c is prepared This ***** hollow 29c is for making it the aforementioned heights 31c for installation (drawing 7 (a)) not contact the wearing side 29 at the time of slide movement of the base 31 at the time of detaching and attaching the base 31. this -- missing -- business -- it can prevent heights 31c for installation becoming obstructive at the time of slide movement, or wearing out heights 31c for installation by hollow 29c

[0017] As shown in aforementioned drawing 9 , the engaging-and-releasing means 6 is formed in the main part case 20 and the liquid crystal display monitor 30. This engaging-and-releasing means 6 has the presser-foot-stitch-tongue-like salient 60 energized by the engagement position by the spring force of the return spring which is not illustrated, and the control unit 61 which makes a non-engaged position carry out slide movement of this presser-foot-stitch-tongue-like salient 60 in the liquid crystal display monitor 30. the engagement to which the aforementioned presser-foot-stitch-tongue-like salient 60 trespasses upon the wearing side 29 of the main part case 20 on the other hand -- the hole 62 is formed the aforementioned presser-foot-stitch-tongue-like salient 60 -- engagement -- by invading from a hole 62 and engaging with the wearing side 29, as the two-dot chain line of drawing 1 shows, this expansion observation equipment can fix now a liquid crystal display monitor 30 to the wearing side 29 of the main part case 20 in the state where made it rotate to the main part case 20 side, and the liquid crystal display monitor 30 was pushed down so that a liquid crystal display monitor 30 may not rotate focusing on the aforementioned hinge region 34

[0018] In addition, with this expansion observation equipment, on the side of the couple of the pars basilaris ossis occipitalis 201 of the aforementioned main part case 20, as shown in drawing 10 , four rubber 202 for cushions is formed. Moreover, the rubber 203

for cushions is formed also in the side of the opposite side of the side which formed the handle 200 in the main part case 20 of drawing 10 (c). Therefore, it has a handle 200 single hand, and as shown in drawing 10 (c), in case the main part case 20 is started, each aforementioned rubber 202,203 protects expansion observation equipment from a shock.

[0019] In the aforementioned composition, the image section 3 can be used for this expansion observation equipment in the state of the controller section 2 and one like drawing 1. On the other hand, in this expansion observation equipment, the base 31 which supports a liquid crystal display monitor 30 free [rotation] around a level axis at the image section 3 was formed, and attachment and detachment of this base 31 were enabled to the main part case 20. And it enables it to have used in the separation state which removed the image section 3 from the main part case 20 as a standing-up base for the aforementioned base 31 making the liquid crystal display monitor 30 stand up. Therefore, the image section 3 can be placed and used for somewhere else [the controller section 2] by supporting a liquid crystal display monitor 30 with the base 31 like drawing 6. Here, since the image section 3 is far lightweight compared with the controller section 2, the image section 3 can be simply rotated to the surroundings of a vertical-axis line like Arrow C. That is, a liquid crystal display monitor 30 can be easily put on a legible position. Moreover, it is placing the image section 3 on desk with the another main part case 20, and Object T can also be observed, without being influenced by the cooling fan within the main part case 20 of vibration.

[0020] Moreover, in the controller section 2 with the big image section 3, since it is another object, the pulse duty factor of a workspace can also be lowered as compared with the former. And with this operation gestalt, since the connectors 28 and 38 for power supplies of drawing 3 are formed, even if it puts on the position which left both, an extension cord etc. is not needed for the main part case 20 and the base 31, respectively. Moreover, it is also easy to exchange only the controller section 2 or the image section 3.

[0021] In addition, the means of communications 27A and 37A of radio may be formed in the controller section 2 and the image section 3, respectively, and a signal may be outputted [without forming the aforementioned connectors 27 and 37 for signals, / as shown in drawing 11] in this invention, and inputted by these means of communications 27A and 37A. In this modification, in separating and using the controller section 2 and the image section 3, the communication wire between both becomes unnecessary. In addition, as communication media of radio, various media, such as an electric wave and infrared radiation, can be used.

[0022] By the way, as the two-dot chain line of drawing 1 shows, after this expansion observation equipment has closed the liquid crystal display monitor 30, a liquid crystal display monitor 30 is fixed to the main part case 20 so that a liquid crystal display

monitor 30 may not rotate focusing on a hinge region 34. Therefore, the whole expansion observation equipment can also be carried.

[0023] Below, the modification of the independence means 31 in this invention is explained. As an independence means 31, you may form one cylindrical supporter material 31 in the tooth back of a liquid crystal display monitor 30 like drawing 12 (a) like the supporter material 31 of a tabular, two cylindrical supporter material 31 of drawing 12 (b), and drawing 12 (c). In addition, each supporter material 31 is attached free [rotation] to the liquid crystal display monitor 30 in this case.

[0024] Moreover, as shown in drawing 13 (a) and (b), the cylindrical supporter material 31 which projects from the tooth back of a liquid crystal display monitor 30 may be formed, this supporter material 31 may be made elastic, and the aforementioned independence means 31 may be constituted. moreover, the support assistance attached in the tooth back of a liquid crystal display monitor 30 like drawing 13 (c) at pantograph-like flexible machine 31p and this flexible machine 31p -- a member -- 31r is prepared and it is good also as an independence means 31

[0025] Moreover, rotation of a liquid crystal display monitor 30 is enabled focusing on a hinge 34 to the base 31, and you may enable it to fix to the main part case 20, where a liquid crystal display monitor 30 and the independence means 31 are folded up, as shown in drawing 14 (a) and (b). In addition, the base 31 is good also as cylindrical.

[0026] Moreover, it prepares in the lower part of the front face 300 of a liquid crystal display monitor 30 free [rotation of the base 31] through a hinge 34, and the 270 degrees or more of the aforementioned liquid crystal display monitors 30 are rotated to the base 31, it folds up like drawing 15 (b), and you may enable it to fix this folded-up liquid crystal display monitor 30 to the main part case 20, as shown in drawing 15 (a). That is, it is not necessary to fix a liquid crystal display monitor 30 to the main part case 20 through the base 31.

[0027] Furthermore, as shown in drawing 16 (a) and (b), the lower part of a liquid crystal display monitor 30 may be thickened, and the independence means 31 may consist of case 301 the very thing of a liquid crystal display monitor 30.

[0028] Below, other examples of the supply method of the power to the image section 3 in this expansion observation equipment are shown. In addition to the 2nd power circuit 33 of the above, in this invention, you may prepare cell applied-part 33A for equipping the image section 3 with a cell like drawing 17 (a). Moreover, it may replace with the 2nd power circuit 33, and as shown in drawing 17 (b) and (c), you may prepare connector 38A for power supplies which connects transformer 33B. Moreover, like drawing 17 (d), only cell applied-part 33A may be prepared and the 2nd power circuit 33 may be connected to cell applied-part 33A in series like drawing 17 (e). In addition, when it enables it to supply a power supply to the image section 3 through the controller section 2, being contained in this invention cannot be overemphasized.

[0029] Below, the modification of the fixed structure of the main part case 20 and the image section 3 is explained. As it is indicated in drawing 18 as the main part case 20 and the image section 3, it may conclude on a screw 70, or as shown in drawing 19, you may fix mutually by the buckle 71 (the so-called PATCHIN lock). Moreover, as shown in drawing 20 (a) - (c), you may fix the main part case 20 and the image section 3 by the hook 73 which had turning effort energized in the direction of an arrow with the energization spring 72.

[0030] Moreover, although it is not necessary to necessarily establish the fixed means 5 of drawing 3, as shown in drawing 21 (a) and (b), after equipping the wearing side 29 of the controller section 2 with the base 31 as a fixed means 5, height (fixed means) 5A is made to project on the wearing side 29, and the base 31 may not be made not to carry out slide movement in the direction of arrow B.

[0031]

[Effect of the Invention] Since attachment and detachment of the image section were enabled to the control case while according to this invention a control case and the image section could be used for one and establishing an independence means to support a drop, as explained above, the image section can be placed and used for somewhere else [the controller section] by making a drop become independent by the independence means. Here, since the image section is far lightweight compared with the controller section, the image section can be simply rotated to the circumference of a vertical-axis line. Moreover, an object can be observed by placing the image section on a desk different from a control case, without being influenced by the cooling fan in a control case of vibration. Moreover, with a control case with the big image section, since it becomes another object, a workspace can also be used effectively.

[0032] In addition, if the base which can rotate freely to a drop is adopted as an independence means, while being able to improve appearance of the whole equipment, it is easy to stabilize a standing-up state.

[0033] Moreover, if it enables it to fix the base and the drop as an independence means to a control case, expansion observation equipment can be carried easily.

[0034] moreover -- while being able to support a liquid crystal display monitor in the state where it was stabilized, by preparing the heights for installation in the base by invention of a claim 7 -- missing -- business -- by having prepared the hollow, the aforementioned heights for installation are worn out at the time of wearing of the base, or it can prevent becoming obstructive

[0035] Moreover, if the connector for connecting a power supply to the image section etc. is prepared, even if it puts on the place which left the image section and the controller section, it has the advantage of not needing an extension cord.